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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/449,801 11/26/99 FORREST

S 10644/50101

EXAMINER

IM22/0815

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ART UNIT

PAPER NUMBER

1774

DATE MAILED:

08/15/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
09/449,801

Applicant(s)  
Stephen R. FORREST et al.

Examiner  
M. Yamnitzky

Art Unit  
1774



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-24 is/are rejected.
- 7) ☒ Claim(s) 8-10 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 9, 10
- 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_

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1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

2. The disclosure is objected to because of the following informalities:

The Application serial number is not given for the copending application incorporated by reference in the first full paragraph on page 30.

Appropriate correction is required.

3. Claims 5-7 and 11-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 20 are rendered indefinite by the requirement for “substantial spectral sensitivity”. The term “substantial” is a relative term and insufficient guidance is given in the present specification to determine the metes and bounds of “substantial spectral sensitivity”.

The meaning of the abbreviations “PTCBI”, “CuPc”, “BCP”, “m-MTDATA” and “PEDOT” are not given in the claims.

Claim 11 and claims dependent therefrom are incomplete because the only component of the at least one subcell that is explicitly set forth in claim 11 is an exciton blocking layer. An exciton blocking layer alone does not constitute a photosensitive optoelectronic subcell, and the

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spatial relationship between the exciton blocking layer and all other unrecited components of the at least one subcell is not set forth in these claims.

There is no antecedent basis for “the subcell” as recited in claim 12, as dependent from claim 10.

There is no antecedent basis for “the electron transport layer” and “the hole transport layer” as recited in claims 13 and 14; claim 11 does not explicitly set forth an electron transport layer or a hole transport layer.

Claim 13 is also grammatically incorrect.

In line 5 of claim 15, a word is apparently missing after “blocking”.

There is no antecedent basis for “the anode” and “the plurality of pairs” as recited in claim 16 as dependent from claim 14. There is no antecedent basis for “the cathode” and “the plurality of pairs” as recited in claim 17 as dependent from claim 14.

Claim 18 is confusing as dependent from claim 14. Claim 18 requires the exciton blocking layer to be something outside the scope of the group set forth in claim 14.

There is no antecedent basis for “the plurality of pairs” as recited in claims 20-24 as dependent from claim 12. Claim 12 does not require a plurality of pairs. There is also no antecedent basis for “the hole transporting layers” or “the electron transporting layers” as recited in claim 20 (emphasis added), or for “the anode” or “the cathode” as recited in claim 24.

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4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshikawa et al. (5,201,961).

Yoshikawa et al. disclose photovoltaic devices comprising two layers of organic electron acceptor material and one layer of organic electron donor material between two electrodes, and disclose devices comprising two layers of organic electron donor material and one layer of organic electron acceptor material. Yoshikawa et al. do not explicitly teach that the properties of the two layers of organic electron acceptor material, or of the two layers of organic electron donor material, are such that one of the two layers functions as an exciton blocking layer.

However, it is the examiner's position that it is reasonable to expect that at least some of Yoshikawa's examples provide devices that inherently meet the limitations of present claims 1, 3 and 5. In particular, the device of prior art Example 5 comprises one layer of electron acceptor material (perylene tetracarboxylic acid bismethylimide) and two layers of electron donor material (one layer of copper phthalocyanine and one layer of quinacridone). The layer of quinacridone is sandwiched between an electrode and the layer of copper phthalocyanine. The bandgap of copper phthalocyanine is disclosed in the present specification as "approximately 1.7 eV". At column 9,

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lines 3-22, Yoshikawa discloses several quinacridone pigments that can be used. Since Example 5, with reference to Example 1, simply recites “quinacridone”, the examiner interprets Example 5 as using non-substituted quinacridone. Non-substituted quinacridone emits light of a peak wavelength of about 540 nm which corresponds to a band gap of about 2.3 eV. Since quinacridone has a higher bandgap than copper phthalocyanine, the layer of quinacridone inherently functions as an exciton blocking layer in the device structure of prior art Example 5.

6. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki et al. (5,350,459).

Suzuki et al. disclose photovoltaic devices comprising two layers of organic electron acceptor material and two layers of organic electron donor material between two electrodes. The layers are provided in the order of electrode, acceptor layer EAOL (I), acceptor layer EAOL (II), donor layer EDOL (I), donor layer EDOL (II) and electrode. Suzuki et al. do not explicitly teach that the properties of the two layers of organic electron acceptor material, or of the two layers of organic electron donor material, are such that one of the two layers functions as an exciton blocking layer.

However, it is the examiner's position that it is reasonable to expect, based on the materials used to make each of the acceptor and donor layers, that at least some of Yoshikawa's examples provide devices that inherently meet the limitations of present claims 1-5 in which

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acceptor layer EAOL (I) functions as an exciton blocking layer and donor layer EDOL (II) functions as an exciton blocking layer.

7. Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. With respect to the IDS received 08/04/00, the examiner has crossed off the copending applications. Two of the applications have issued as patents since the filing of the IDS; the corresponding patent information has been listed in the U.S. Patent Documents section. Some of the other applications are currently allowed, but not yet patented. The corresponding patent information will be made of record via a PTO-892 at a later date for any of the other cited applications that issue as patents prior to disposal of the present application.

9. Applicant is advised that should claim 14 be found allowable, claim 19 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

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10. If claims 16-24 are amended to depend from claim 15, the preamble of claims 16-24 must also be corrected because claim 15 is drawn to an organic "photodetector" rather than to a generic "device".

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner can generally be reached at this number from 6:45 a.m. to 3:15 p.m. Monday-Friday.

The current fax numbers for Art Unit 1774 are (703) 305-3599 for official after final faxes and (703) 305-5408 for all other official faxes. (Unofficial faxes for Art Unit 1774 can be sent to (703) 305-5436.)

MRY  
08/13/01

*Marie R. Yamnitzky*

MARIE YAMNITZKY  
PRIMARY EXAMINER

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